

CLAIMS

1. A phase modulation apparatus that generates a phase modulation signal by performing phase modulation on an input signal, said phase modulation apparatus comprising:

5 a modulation signal generation section that generates a first baseband modulation signal and a second baseband modulation signal based on said input signal;

a PLL circuit; and

a switching section that switches between having
10 said PLL circuit generate a phase modulation signal by performing 1-point modulation, or generate a phase modulation signal by performing 2-point modulation, by switching between inputting said first baseband modulation signal, or inputting said first baseband
15 modulation signal and said second baseband modulation signal, to said PLL circuit, according to a communication mode.

2. The phase modulation apparatus according to claim
20 1, further comprising a determination section that performs a comparative determination of a size relationship of a modulation bandwidth corresponding to a communication mode and a bandwidth of said PLL circuit,

wherein said switching section performs switching
25 according to said control signal.

3. The phase modulation apparatus according to claim

2, wherein:

said determination section sends a control signal to a loop filter that is a component of said PLL circuit; and

5 said loop filter changes its own resonance frequency based on said control signal sent from said determination section, and changes a bandwidth of said PLL circuit.

4. The phase modulation apparatus according to claim
10 2, wherein said determination section sends said control signal to a reference frequency divider that provides a reference signal to a phase comparator of said PLL circuit and a division ratio generation section that generates a division ratio of said PLL circuit, changes an
15 oscillation frequency of said reference frequency divider and a division ratio of said division ratio generation section, and changes a bandwidth of said PLL circuit.

5. The phase modulation apparatus according to claim
20 2, wherein:

said communication modes are of two kinds, GSM mode and UMTS mode; and

said determination section sends a control signal to said switching section so that 1-point modulation is
25 performed in said GSM mode, and sends a control signal to said switching section so that 2-point modulation is performed in said UMTS mode.

6. The phase modulation apparatus according to claim 2, wherein:

said communication modes are of two kinds, GSM mode
5 and UMTS mode; and

said determination section sends a control signal to said switching section so that 1-point modulation is performed in said GSM mode, and in said UMTS mode, sends a control signal to said switching section so that 2-point
10 modulation is performed, and also sends a control signal to a loop filter and changes a bandwidth of said PLL circuit in a wideband direction.

7. The phase modulation apparatus according to claim
15 2, wherein:

said communication modes are of three kinds, GSM mode, Bluetooth mode, and UMTS mode; and

said determination section sends a control signal to said switching section so that 1-point modulation is performed in said GSM mode; and in said Bluetooth mode,
20 sends a control signal to said switching section so that 2-point modulation is performed, and also sends a control signal to a loop filter and changes a bandwidth of said PLL circuit in a wideband direction; and in said UMTS
25 mode, sends a control signal to said switching section so that 2-point modulation is performed, and also sends a control signal to a loop filter and changes a bandwidth

of said PLL circuit further in a wideband direction than in case of said Bluetooth mode.

8. A communication device that incorporates the phase modulation apparatus according to claim 1.

9. A mobile radio device that incorporates the phase modulation apparatus according to claim 1.

10. A phase modulation method that generates a phase modulation signal by performing phase modulation on a transmit signal, said phase modulation method comprising:
a step of performing a comparative determination of a size relationship of a modulation bandwidth of a communication mode and a bandwidth of a PLL circuit;
a step of switching said PLL circuit to 1-point modulation when a modulation bandwidth of a communication mode is narrowband compared with a bandwidth of said PLL circuit, and switching said PLL circuit to 2-point modulation when a modulation bandwidth of said communication mode is wideband compared with a bandwidth of said PLL circuit; and
a step of, when said PLL circuit is switched to 2-point modulation, changing a resonance frequency of a loop filter of that PLL circuit and changing a bandwidth of said PLL circuit in a wideband direction.

11. A phase modulation method that generates a phase modulation signal by performing phase modulation on a transmit signal, said phase modulation method comprising:

5 a step of performing a comparative determination of a size relationship of a modulation bandwidth of a communication mode and a bandwidth of a PLL circuit;

a step of switching said PLL circuit to 1-point modulation when a modulation bandwidth of a communication mode is narrowband compared with a bandwidth of said PLL circuit, and switching said PLL circuit to 2-point modulation when a modulation bandwidth of said communication mode is wideband compared with a bandwidth of said PLL circuit; and

15 a step of, when said PLL circuit is switched to 2-point modulation, changing a reference frequency of that PLL circuit and changing a bandwidth of said PLL circuit in a wideband direction.